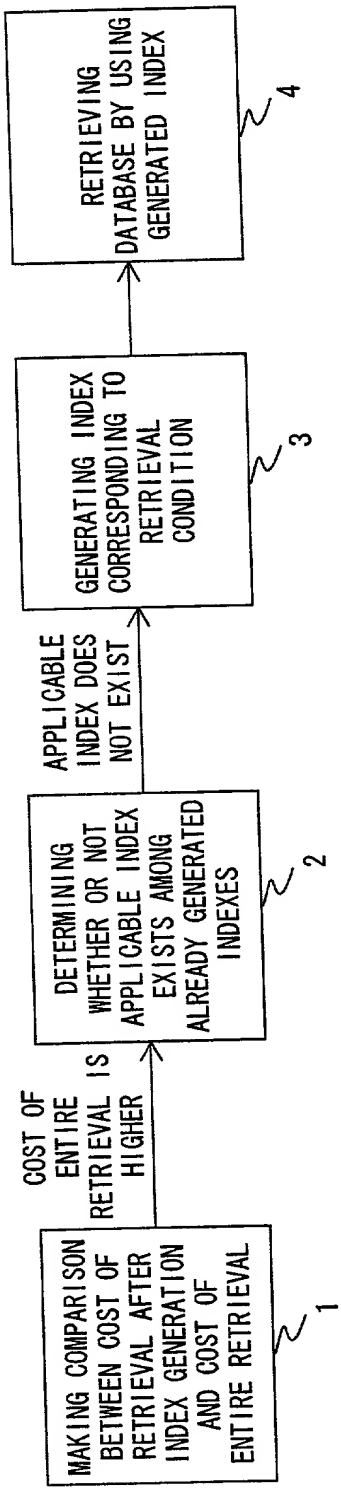
MAKING COMPARISON BETWEEN COST OF RETRIEVAL AFTER INDEX GENERATION AND COST OF ENTIRE RETRIEVAL
1
COST OF ENTIRE RETRIEVAL IS HIGHER
DETERMINING WHETHER OR NOT APPLICABLE INDEX EXISTS AMONG ALREADY GENERATED INDEXES
2
APPLICABLE INDEX DOES NOT EXIST
GENERATING INDEX CORRESPONDING TO RETRIEVAL CONDITION
3
RETRIEVING DATABASE BY USING GENERATED INDEX
4

FIG. 1

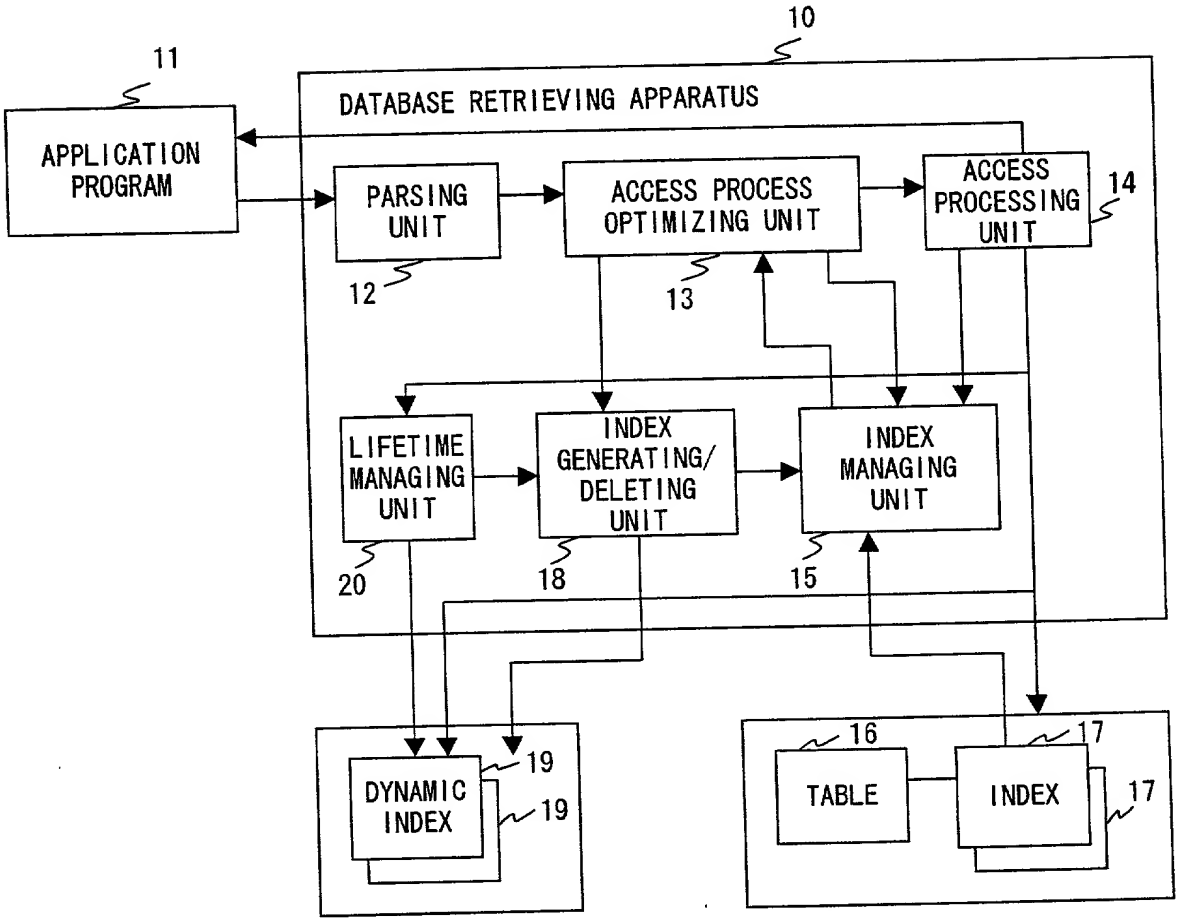
10
11
DATABASE RETRIEVING APPARATUS
APPLICATION PROGRAM
PARSING UNIT
ACCESS PROCESS OPTIMIZING UNIT
ACCESS PROCESSING UNIT
14
12
13
LIFETIME MANAGING UNIT
INDEX GENERATING/ DELETING UNIT
INDEX MANAGING UNIT
20
18
15
DYNAMIC INDEX
19
19
16
17
TABLE
INDEX
17

FIG. 2

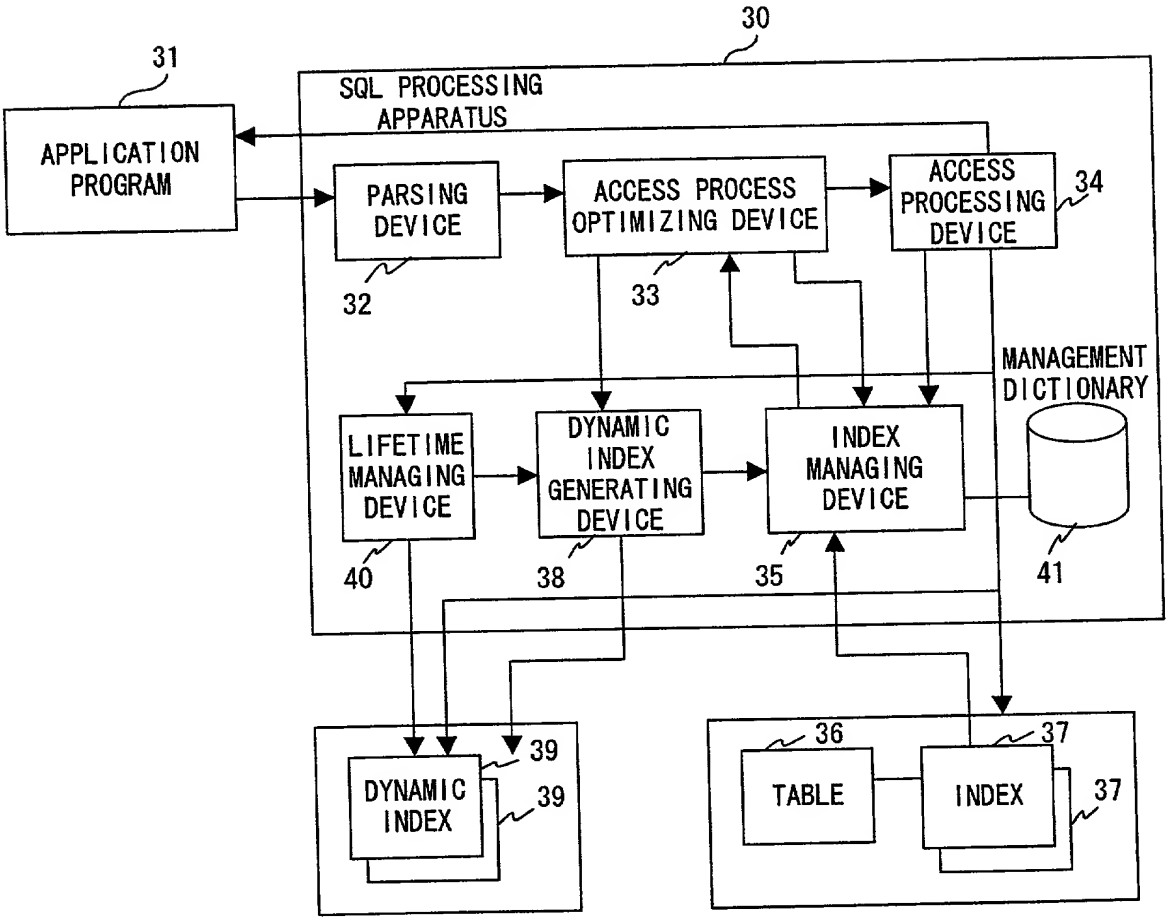
30
31
SQL PROCESSING APPARATUS
APPLICATION PROGRAM
PARSING DEVICE
ACCESS PROCESS OPTIMIZING DEVICE
ACCESS PROCESSING DEVICE
34
32
33
MANAGEMENT DICTIONARY
LIFETIME MANAGING DEVICE
DYNAMIC INDEX GENERATING DEVICE
INDEX MANAGING DEVICE
40
38
35
41
39
DYNAMIC INDEX
39
36
37
TABLE
INDEX
37

FIG. 3

EXPRESS MAIL NO. EL 914 707 450 US

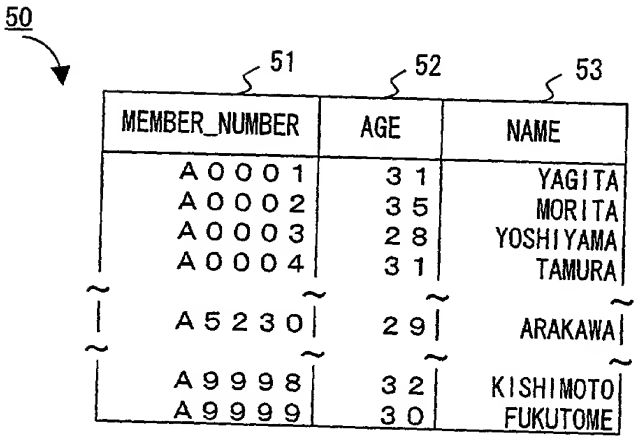

FIG. 4

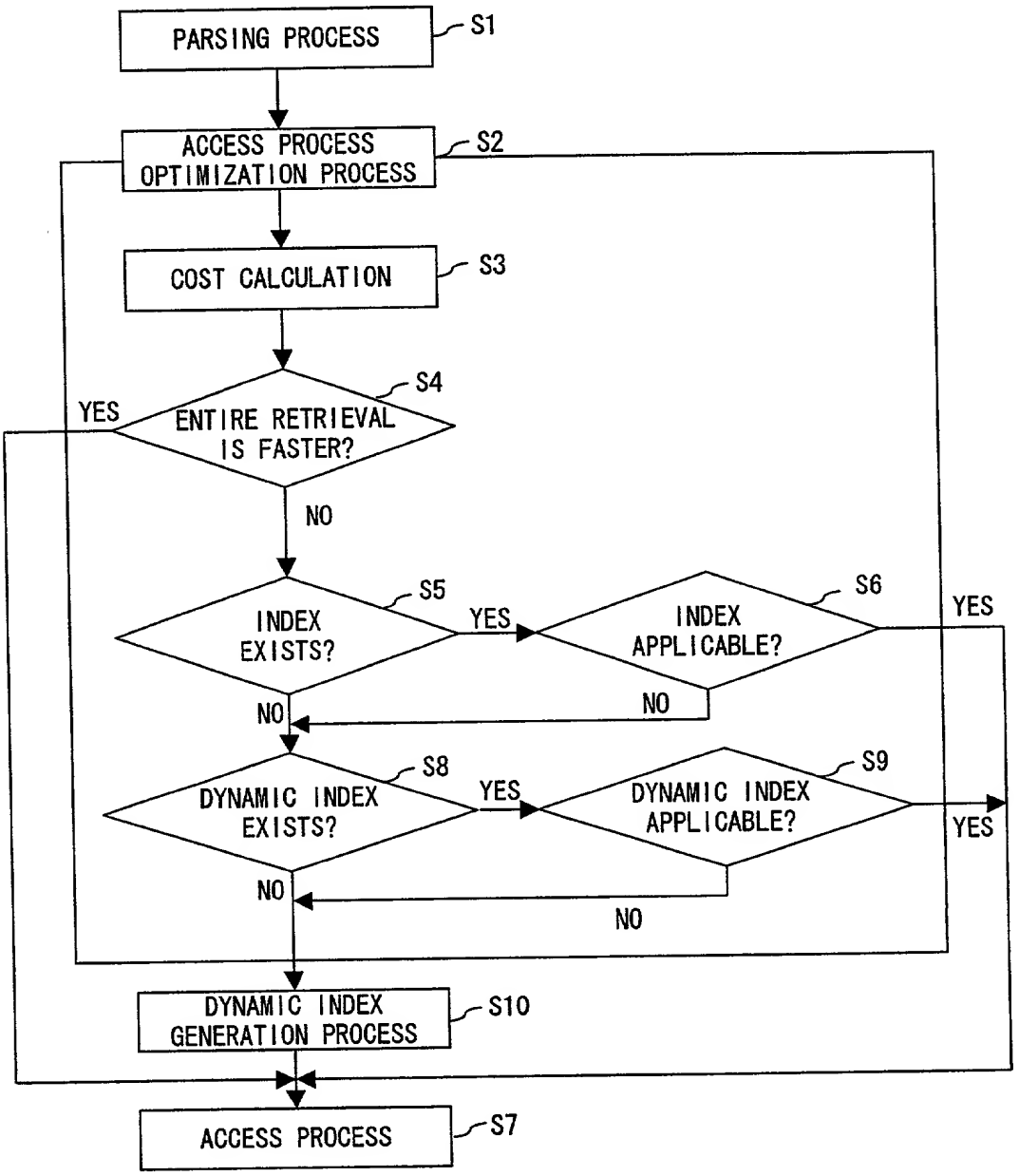

FIG. 5

09617984 - 092404

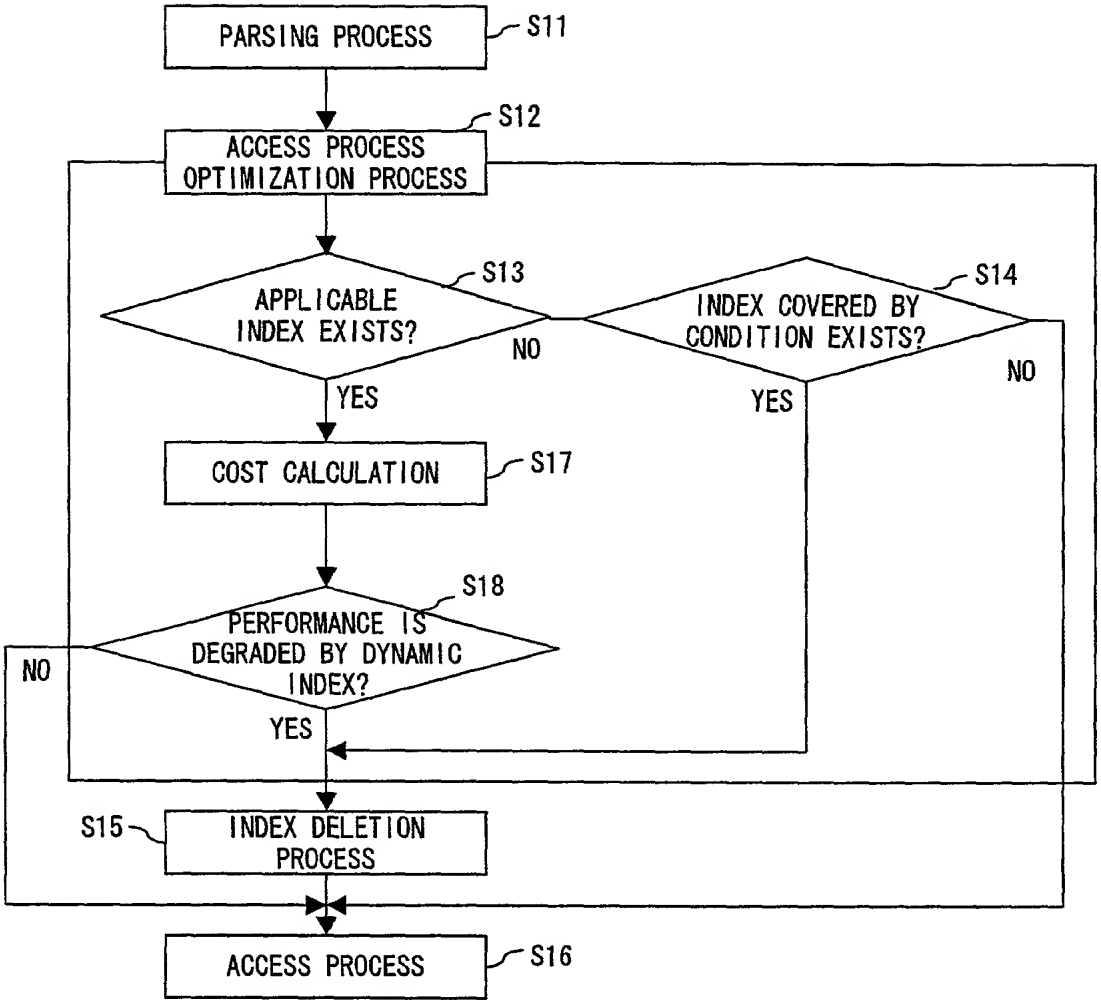
PARSING PROCESS
S11
ACCESS PROCESS OPTIMIZATION PROCESS
S12
APPLICABLE INDEX EXISTS?
S13
NO
YES
INDEX COVERED BY CONDITION EXISTS?
S14
NO
YES
COST CALCULATION
S17
PERFORMANCE IS DEGRADED BY DYNAMIC INDEX?
S18
NO
YES
S15
INDEX DELETION PROCESS
ACCESS PROCESS
S16

FIG. 6

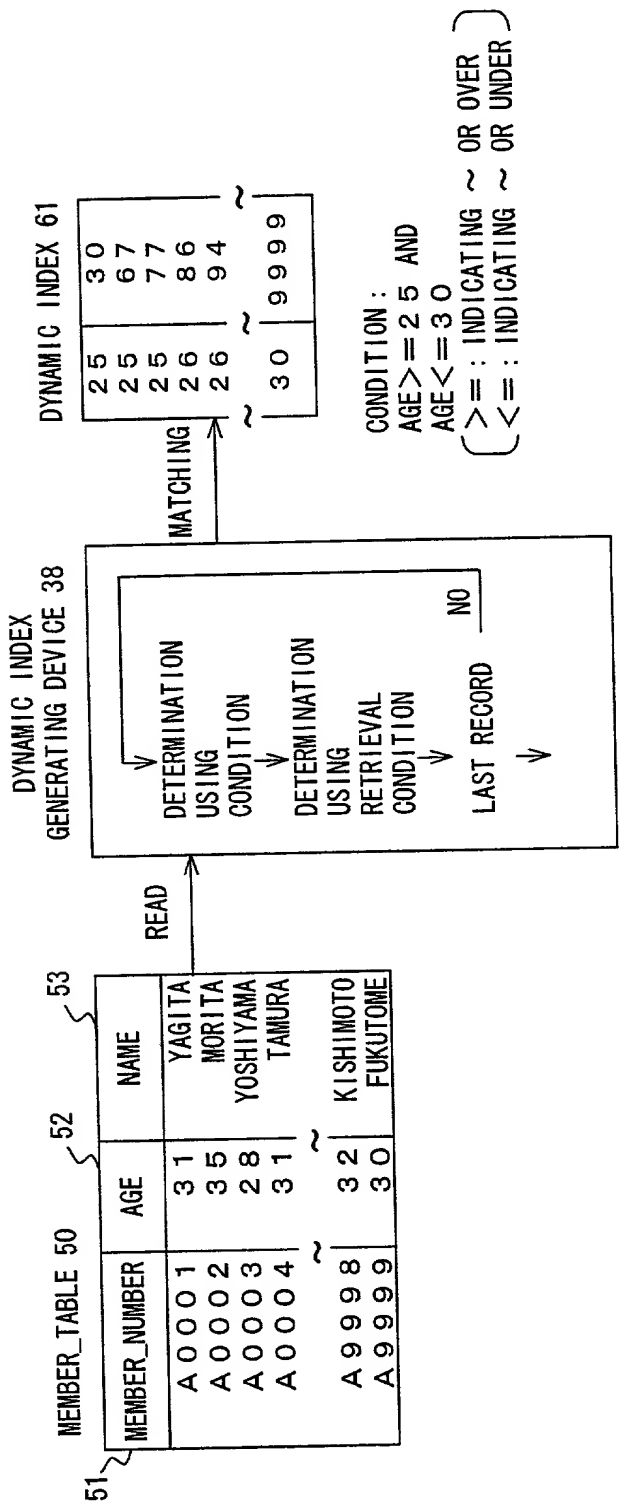
MEMBER_TABLE 50
MEMBER_NUMBER
AGE
NAME
A0001 31 YAGITA
A0002 35 MORITA
A0003 28 YOSHIYAMA
A0004 31 TAMURA
A9998 32 KISHIMOTO
A9999 30 FUKUTOME
51
52
53
READ
DYNAMIC INDEX GENERATING DEVICE 38
DETERMINATION USING CONDITION
DETERMINATION USING RETRIEVAL CONDITION
LAST RECORD
NO
MATCHING
DYNAMIC INDEX 61
25 30
25 67
25 77
26 86
26 94
30 9999
CONDITION :
AGE>=25 AND
AGE<=30
(>= : INDICATING ~ OR OVER
<= : INDICATING ~ OR UNDER)

FIG. 7

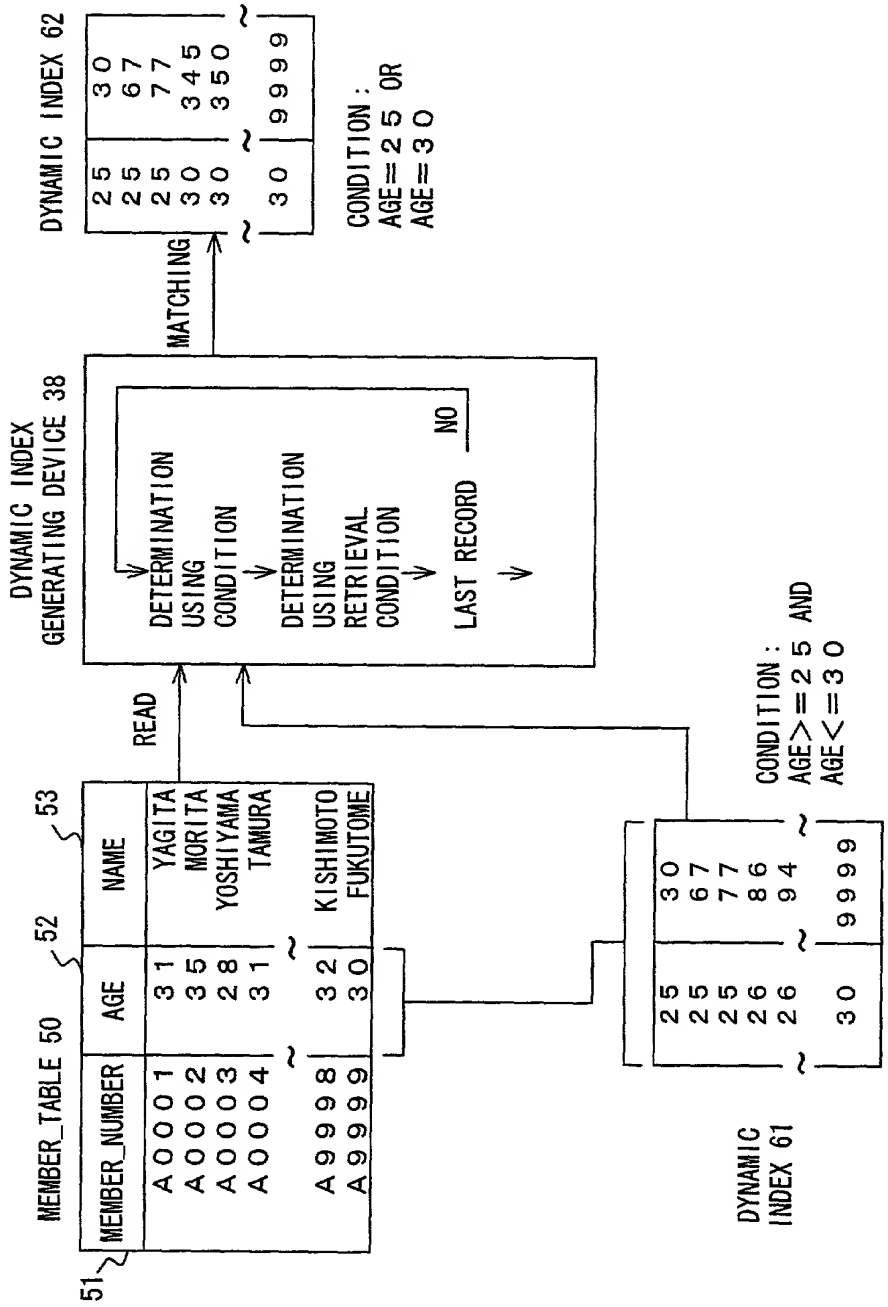
MEMBER_TABLE 50
MEMBER_NUMBER
AGE
NAME
A0001 31 YAGITA
A0002 35 MORITA
A0003 28 YOSHIYAMA
A0004 31 TAMURA
A9998 32 KISHIMOTO
A9999 30 FUKUTOME
51
52
53
READ
DYNAMIC INDEX GENERATING DEVICE 38
DETERMINATION USING CONDITION
DETERMINATION USING RETRIEVAL CONDITION
LAST RECORD
NO
MATCHING
DYNAMIC INDEX 62
25 30
25 67
25 77
30 345
30 350
30 9999
CONDITION : AGE=25 OR AGE=30
CONDITION : AGE>=25 AND AGE<=30
DYNAMIC INDEX 61
25 30
25 67
25 77
26 86
26 94
30 9999

FIG. 8

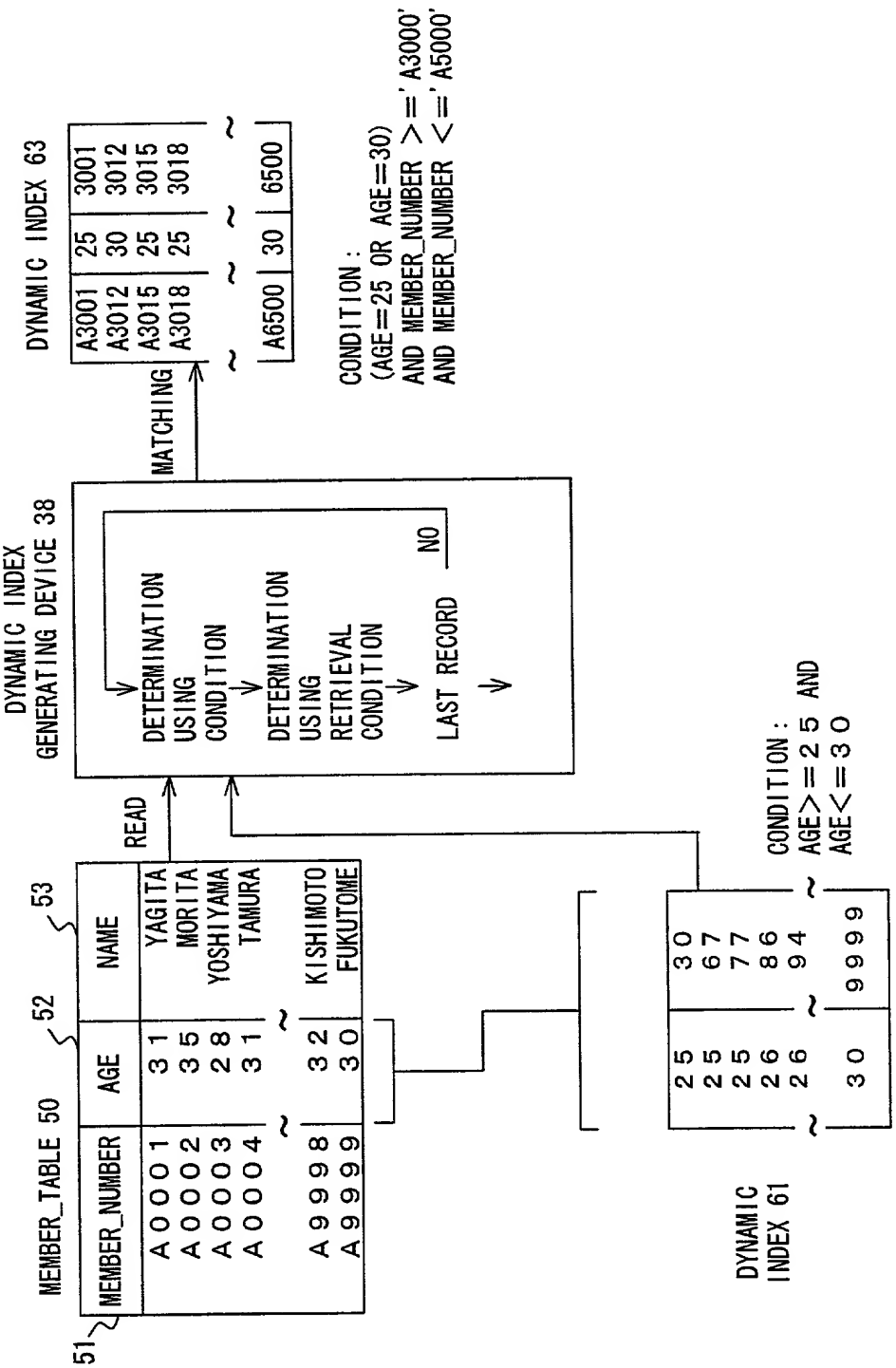
MEMBER_TABLE 50
51
52
53
MEMBER_NUMBER
AGE
NAME
A00001 31 YAGITA
A00002 35 MORITA
A00003 28 YOSHIYAMA
A00004 31 TAMURA
A9998 32 KISHIMOTO
A9999 30 FUKUTOME
READ
DYNAMIC INDEX GENERATING DEVICE 38
DETERMINATION USING CONDITION
DETERMINATION USING RETRIEVAL CONDITION
LAST RECORD
NO
MATCHING
DYNAMIC INDEX 63
A3001 25 3001
A3012 30 3012
A3015 25 3015
A3018 25 3018
A6500 30 6500
CONDITION :
(AGE=25 OR AGE=30)
AND MEMBER_NUMBER >='A3000'
AND MEMBER_NUMBER <='A5000'
DYNAMIC INDEX 61
25 30
25 67
25 77
26 86
26 94
30 9999
CONDITION :
AGE>=25 AND
AGE<=30

FIG. 9

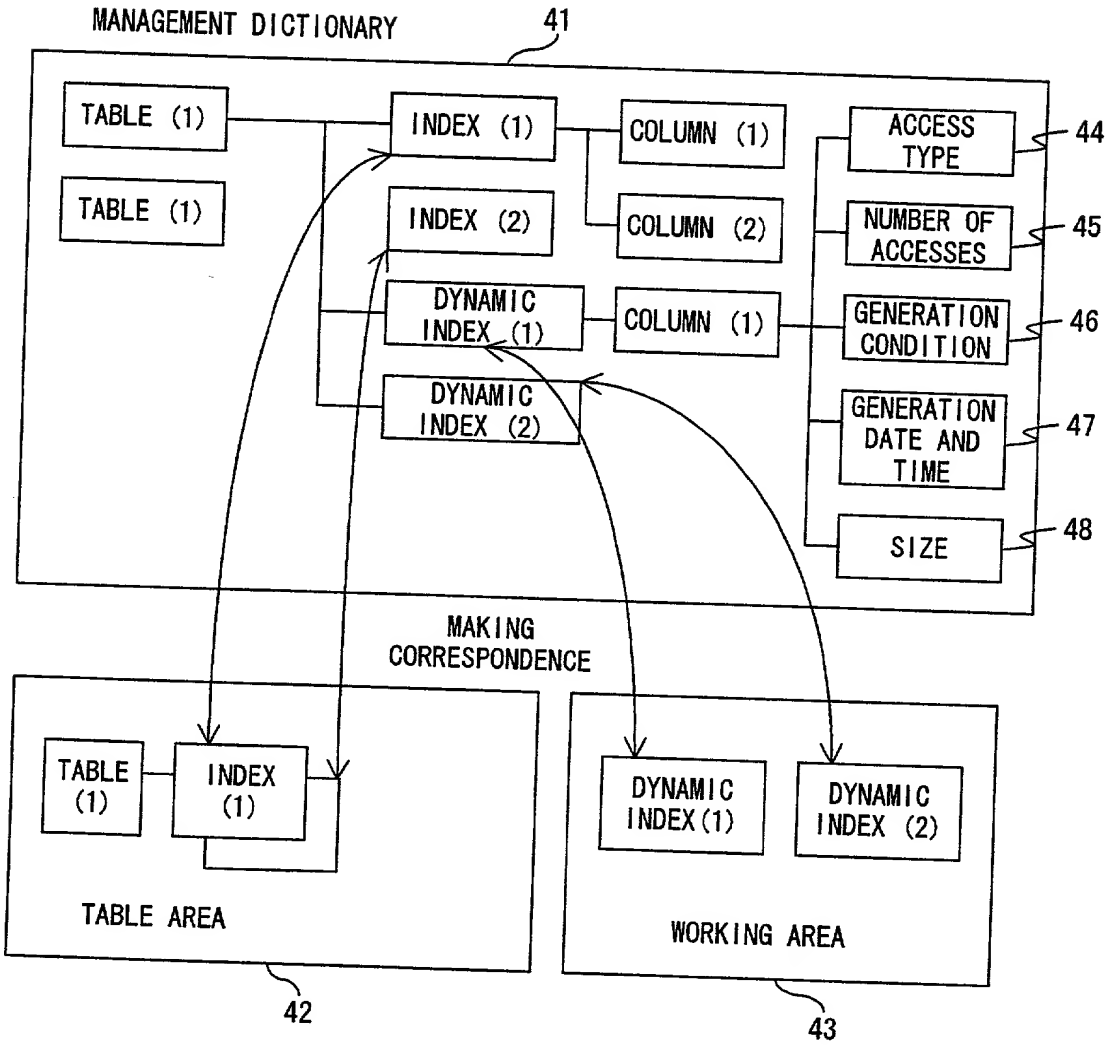
MANAGEMENT DICTIONARY
41
TABLE (1)
TABLE (1)
INDEX (1)
INDEX (2)
DYNAMIC INDEX (1)
DYNAMIC INDEX (2)
COLUMN (1)
COLUMN (2)
COLUMN (1)
ACCESS TYPE
44
NUMBER OF ACCESSES
45
GENERATION CONDITION
46
GENERATION DATE AND TIME
47
SIZE
48
MAKING CORRESPONDENCE
TABLE (1)
INDEX (1)
TABLE AREA
42
DYNAMIC INDEX(1)
DYNAMIC INDEX (2)
WORKING AREA
43

FIG. 10

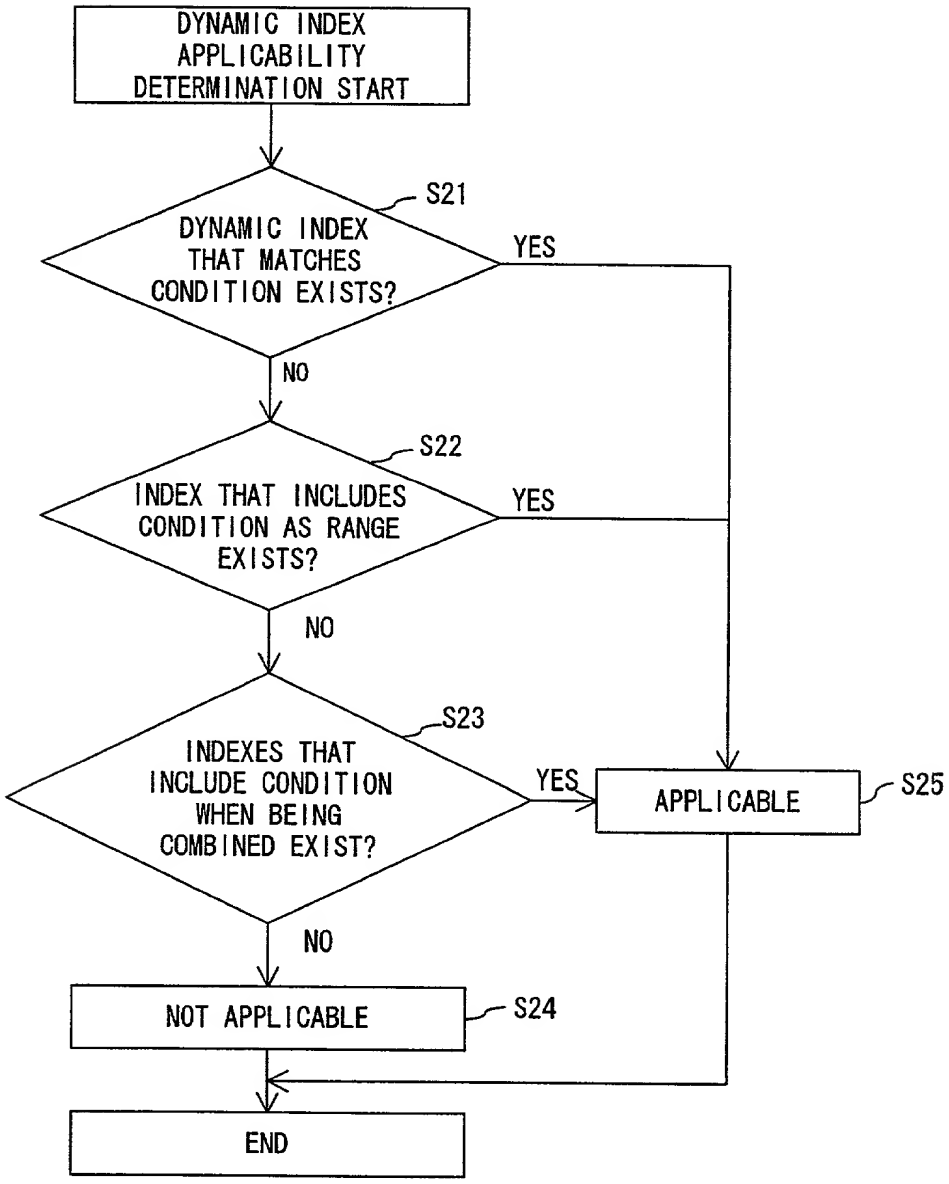
DYNAMIC INDEX APPLICABILITY DETERMINATION START
S21
DYNAMIC INDEX THAT MATCHES CONDITION EXISTS?
YES
NO
S22
INDEX THAT INCLUDES CONDITION AS RANGE EXISTS?
YES
NO
S23
INDEXES THAT INCLUDE CONDITION WHEN BEING COMBINED EXIST?
YES
APPLICABLE
S25
NO
NOT APPLICABLE
S24
END

FIG. 11

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	CONDITION OF ALREADY GENERATED DYNAMIC INDEX
DYNAMIC INDEX 1	MEMBER_NUMBER >='A4500' AND MEMBER_NUMBER <='A7000'
DYNAMIC INDEX 2	MEMBER_NUMBER >='A3000' AND MEMBER_NUMBER <='A5000'
DYNAMIC INDEX 3	MEMBER_NUMBER >='A0500' AND MEMBER_NUMBER <='A2000'
DYNAMIC INDEX 4	MEMBER_NUMBER >='A2500' AND MEMBER_NUMBER <='A5000'

>= : INDICATING ~ OR LARGER
<= : INDICATION ~ OR SMALLER

FIG. 12

Database System

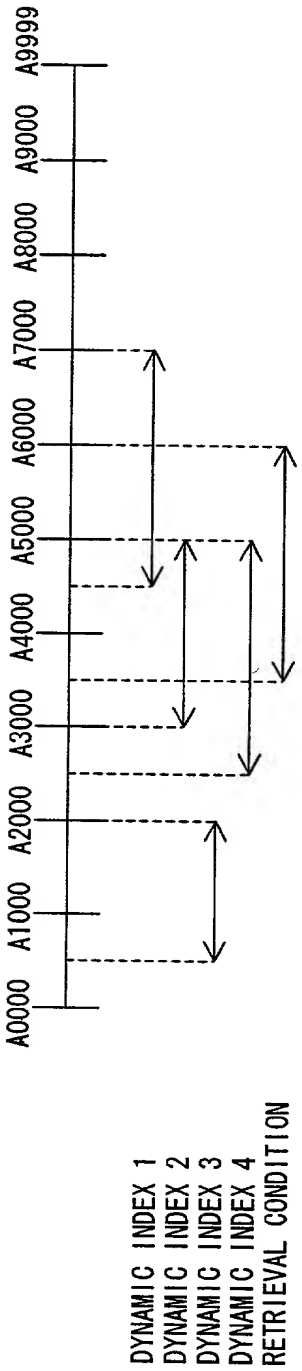
A0000
A1000
A2000
A3000
A4000
A5000
A6000
A7000
A8000
A9000
A9999
DYNAMIC INDEX 1
DYNAMIC INDEX 2
DYNAMIC INDEX 3
DYNAMIC INDEX 4
RETRIEVAL CONDITION

FIG. 13

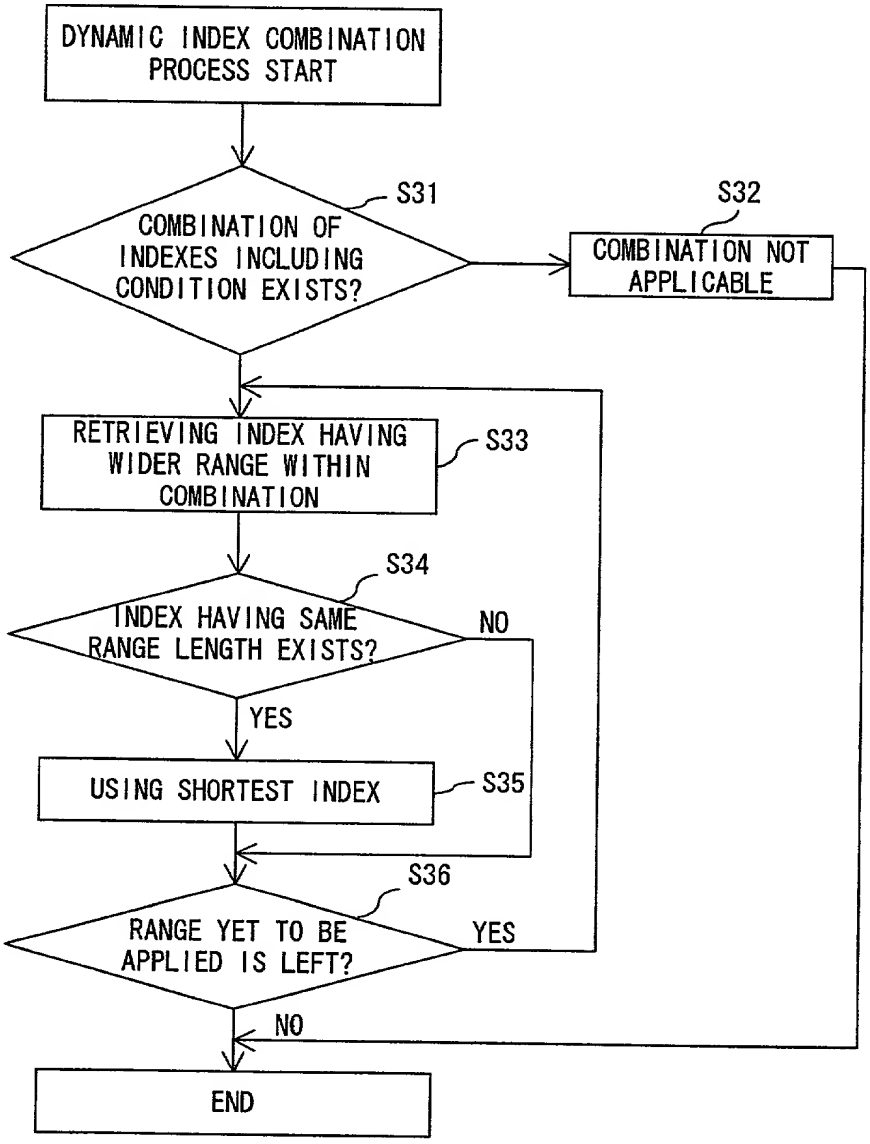

FIG. 14

09744784 - 072402

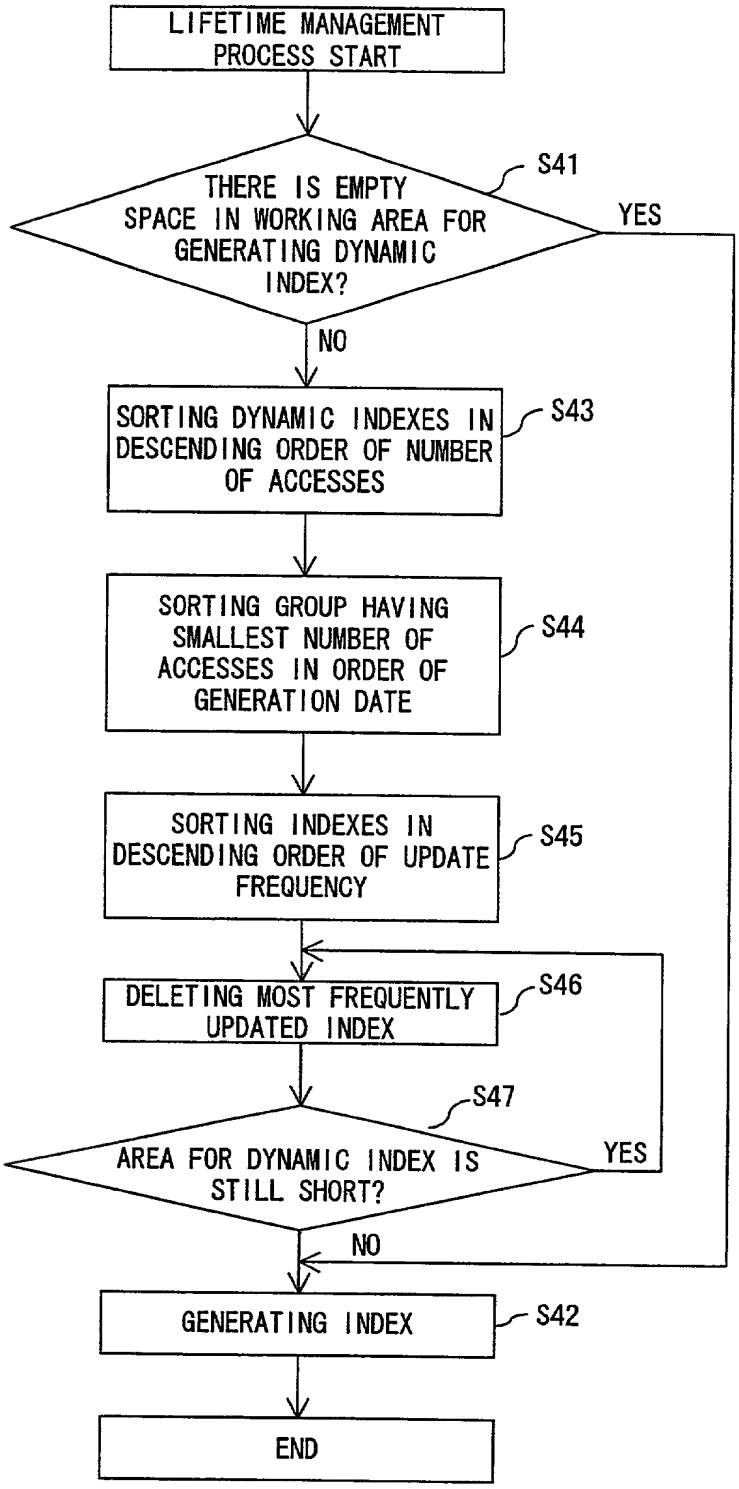

FIG. 15

US 6,374,264 B1

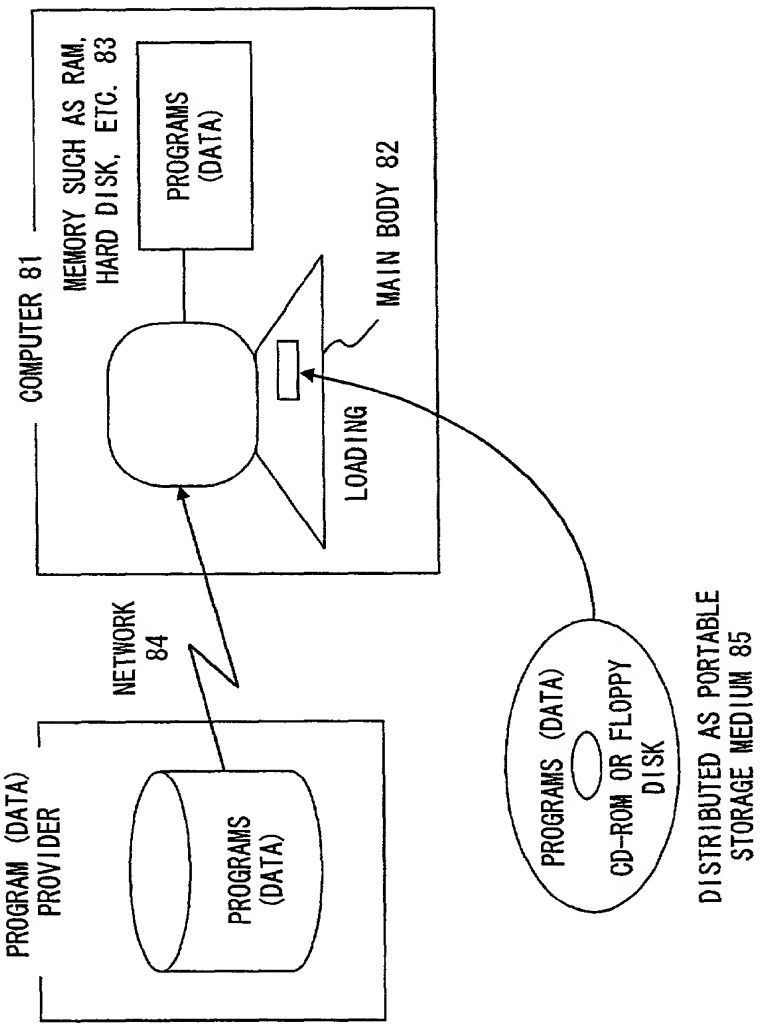
COMPUTER 81
MEMORY SUCH AS RAM, HARD DISK, ETC. 83
PROGRAMS (DATA)
MAIN BODY 82
LOADING
NETWORK 84
PROGRAM (DATA) PROVIDER
PROGRAMS (DATA)
PROGRAMS (DATA)
CD-ROM OR FLOPPY DISK
DISTRIBUTED AS PORTABLE STORAGE MEDIUM 85

FIG. 16

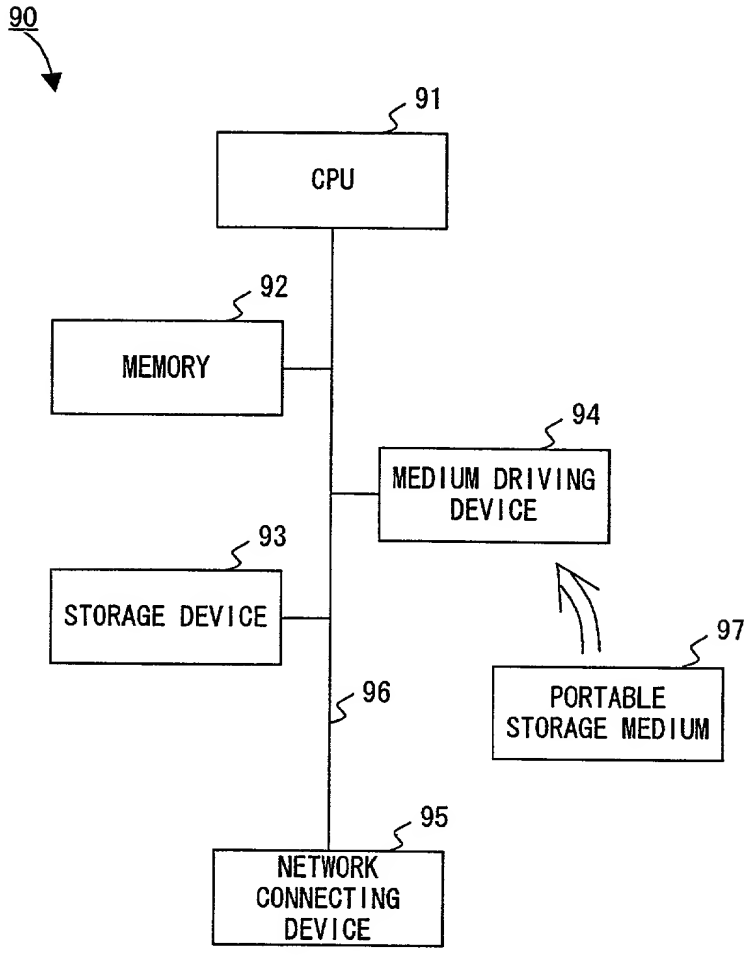

FIG. 17

US 6,954,763 B2